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# REGULATORY SCOPING EXERCISE FOR THE USE OF MARITIME AUTONOMOUS SURFACE SHIPS (MASS)

## Ongoing MASS trials in the Russian Federation

**Submitted by the Russian Federation**

**SUMMARY**

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| *Executive summary:* | This document provides information on MASS trials carried out by the Russian Federation within the comprehensive Autonomous and Remote Navigation Trial Project being implemented in accordance with "MARINET" road map of the National Technology Initiative. Ongoing trials involve four commercial vessels (tanker, bulk carrier, dredger and barge) and suppose testing of the same set of solutions in the real conditions in three different areas (Barents, Black and Caspian Seas). In conjunction with the development of national legislation for the conducting of trials and subsequent operation of MASS the project shall allow to create universal approach and technology architecture for upgrading any type of commercial vessels to MASS. The project was started in 2019, onboard trials planned to start in April 2020, final results are expected by the end of 2020. |
| *Strategic direction, if applicable:* | 2 |
| *Output:* | 2.7 |
| *Action to be taken:* | Paragraph 10 |
| *Related document:* | MSC.1/Circ.1604 |


### Autonomous and Remote Navigation Trial Project

1 Autonomous and Remote Navigation Trial Project is implemented as part of the "MARINET" road map of the National Technology Initiative with support by the Ministry of Industry and Trade of the Russian Federation, with the involvement of the Ministry of Transport of the Russian Federation and Russian Maritime Register of Shipping.

2 The aim of the project is to develop and to test standard set of technologies (Basic Technology Platform) for MASS and approach for its implementation on different commercial vessels with different levels of current automation and with different operation conditions. The general purpose of the project is to open a wide MASS trial operation by shipping companies under the flag of the Russian Federation in accordance with the recently developed national legislation for the conducting of trials and subsequent operation of MASS.

3 The project involves the following commercial vessels by the major Russian shipping companies:

.1 **Mikhail Ulyanov**, shuttle tanker owned by SCF, IMO: 9333670, MMSI: 273328440, home port: Saint Petersburg, project: R-70046, operating in the Barents Sea;

.2 **Pola Anfisa**, general cargo ship owned by Pola Rise, IMO: 9851115, MMSI: 273448220, home port: Saint Petersburg, project: RSD-59, currently operating in the Caspian Sea; and

.3 **Rabochaya**, motor barge owned by Rosmorport, IMO: 9838371, MMSI: 273436710, home port; Saint Petersburg, project: HB900, currently operating in the Black Sea together with REDUT dredger.

4 The set of solutions (Basic Technology Platform) includes:

.1 Autonomous Navigation System (ANS) including extended functionality of ECDIS, Collision Avoidance Module and Sensor Fusion Module. Sensor Fusion Module integrates, synchronize and validate navigational data from different sources including optical system. Collision Avoidance Module defines the routes and manoeuvres of the vessel to avoid collisions with navigational hazards in accordance with determined rules based on COLREG 1972. Extended ECDIS integrates all this data, charts and other information and presents it via human interfaces.

.2 Environment Surveillance System (ESS), optical system detecting and recognizing surrounding objects, transmitting data about objects in a machine-readable form to the ANS, and the processed video image to the human interfaces (Remote Control Centre and Bridge Adviser).

.3 Coordinated Motion Control System (CMC) keeping math model of the ship, navigational and technical parameters of the vessel, and transforming ANS and Remote Control commands into control signals to ship actuators. It also includes mode switch between Autonomous and Manual modes.

.4 Engine and Technical Control System monitor and control ship hardware, and transmits data to ANS and CMC as well as via human interfaces. As an additional subsystem it includes Internal CCTV remotely operated from Bridge Adviser and Remote Control Centre with automatic alerts option based on automatic image recognition.

.5 Remote Control Centre Operator (RCC) is a comprehensive interface for remote navigation including interfaces for navigation and technical control systems, external and internal video surveillance, bridge video link, radio communication as well as motion and ESS controls. It is placed outside MASS: in cases 3.1 and 3.2 – ashore in centres of shipping companies, in case 3.3 – on board of dredger as the head vessel of caravan (to try MASS navigation in caravan mode).

.6 Bridge Adviser is the human interface for the crew on board MASS with the same functionality as RCC, but without controls (since the crew has opportunity to utilize traditional vessel controls and bridge systems).

.7 Detailed Data Recorder to gather all the data on board.

.8 Configuration Manager is a tool for systems health check and monitoring as well as for installation and tuning of the systems of the Basic Technology Platform.

.9 Communication System links onboard systems with RCC.

5 The project consists of several stages:

.1 development of the basic solutions and alignment with the national legal framework;

.2 gathering field data from vessels with further processing of specific scenarios ashore;

.3 testing of each of scenarios of autonomous and remote navigation on vessels under the crew supervision with additional control by shipping company; and

.4 trial voyages under the crew supervision with additional control by shipping company.

6 Development and ashore testing of the Basic Technology Platform is based on the functional approach in conjunction with detailed risk assessment and formal safety assessment approach. In spite of the permanent crew supervision during the trials, functional requirements to the systems include full set of cyber risks mitigation including communication channel protection, redundancy and disaster recovery (with split of onboard systems into two server racks). Every system installed on board was agreed by the Russian Maritime Register of Shipping. The systems development started in 2019.

7 Testing in real conditions is provided under the permanent crew supervision with additional control by the shipping company and technical specialists by the systems developers. Every action is controlled, measured and evaluated. In case of any incident or failure during trials the trial will be immediately stopped and emergency actions will be taken. Thus, during the trials it will be provided the same degree of safety, security and protection of the environment as by the traditional instruments. The testing period is April 2020 – November 2020.

8 Cargo owners, insurance companies and other related parties are (to be) informed about carried out tests in advance.

9 Results of the trials within the Autonomous and Remote Navigation Trial Project are expected to be presented in December 2020.

**Action requested of the Committee**

10 The Committee is invited to note the information provided and to comment as it deems appropriate, as well as to recommend to use the information in MASS trials worldwide.